

What is claimed is:

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1. An outermost surface covering not less than 55% of stainless steel said surface having a thickness from 0.1 to 15 microns and substantially comprising a spinel of the formula $Mn_xCr_{3-x}O_4$ wherein x is from 0.5 to 2.

10 2. The surface according to claim 1, wherein the stainless steel comprises from 13 to 50 weight % of Cr and 0.2 to 3.0 weight % Mn.

3. The surface according to claim 2, wherein the stainless steel comprises from 20 to 38 weight % of Cr and 0.5 to 2.0 weight % Mn.

20 4. The surface according to claim 3, wherein the stainless steel further comprises from 20 to 50 weight % of Ni, from 0.3 to 2.0 weight % of Si and less than 5 weight % of titanium, niobium and all other trace metals, and carbon in an amount less than 0.75 weight %.

5. The surface according to claim 4, covering not less than 60% of the stainless steel.

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6. The surface according to claim 4, covering not less than 80% of the stainless steel.

7. The surface according to claim 4, covering not less than 95% of the stainless steel.

8. The surface according to claim 5, wherein the surface layer is a spinel of the formula $Mn_xCr_{3-x}O_4$ wherein x is from 0.5 to 2 and has a thickness from 0.1 to 10 microns.

9. The surface according to claim 6, wherein the surface layer is a spinel of the formula $Mn_xCr_{3-x}O_4$ wherein x is from 0.5 to 2 and has a thickness from 0.1 to 10 microns.

10. The surface according to claim 7, wherein the surface layer is a spinel of the formula $Mn_xCr_{3-x}O_4$ wherein x is from 0.5 to 2 and has a thickness from 0.1 to 10 microns.

11. A stainless steel pipe or tube having an inner surface according to claim 8.

12. A stainless steel pipe or tube having an inner surface according to claim 9.

13. A stainless steel pipe or tube having an inner surface according to claim 10.

14. A stainless steel reactor having an inner surface according to claim 8.

15. A stainless steel reactor having an inner surface according to claim 9.

16. A stainless steel reactor having an inner surface according to claim 10.

10 17. A stainless steel heat exchange having an inner surface according to claim 8.

18. A stainless steel heat exchange having an inner surface according to claim 9.

20 19. A stainless steel heat exchange having an inner surface according to claim 10.

20. A heat exchange having a cooling surface comprising stainless steel according to claim 8.

30 21. A heat exchange having a cooling surface comprising stainless steel according to claim 9.

22. A heat exchange having a cooling surface comprising stainless steel according to claim 10.

23. A process for the thermal cracking of a hydrocarbon comprising passing said hydrocarbon at elevated temperatures through stainless steel tubes, pipes, or coils according to claim 11.

24. A process for the thermal cracking of a hydrocarbon comprising passing said hydrocarbon at elevated temperatures through stainless steel tubes, pipes, or coils according to claim 12.

25. A process for the thermal cracking of a hydrocarbon comprising passing said hydrocarbon at elevated temperatures through stainless steel tubes, pipes, or coils according to claim 13.

26. A process for altering the enthalpy of a fluid comprising passing the fluid through a heat exchanger according to claim 17.

27. A process for altering the enthalpy of a fluid comprising passing the fluid through a heat exchanger according to claim 18.

28. A process for altering the enthalpy of a fluid comprising passing the fluid through a heat exchanger according to claim 19.

29. A process for altering the enthalpy of a fluid comprising passing the fluid through a heat exchanger according to claim 20.

30. A process for altering the enthalpy of a fluid comprising passing the fluid over a heat exchanger according to claim 21.

31. A process for altering the enthalpy of a fluid comprising passing the fluid over a heat exchanger according to claim 22.

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